

REMARKS

Claims 1-3, 6, 8-11, 26, 28-32, 35, 37, 38, 45, 47, and 49 are pending in the application. No new matter is added by virtue of the Remarks herein. Applicant respectfully requests allowance of the application.

Petition for extension of time

A petition for a three (3) month extension of time under 37 C.F.R. §1.136(a) is included herewith, as well as the fee under 37 C.F.R. §1.117(a)(3).

Rejections under 35 U.S.C. §112

Claim 1 is rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. This rejection is directed at the following portion of claim 1 (underlining provided in Office Action, at page 3):

“generating at least two transfer functions representative of a ratio of energy of the acoustic signal received using at least two different acoustic microphones of the at least two acoustic microphones when the VAD indicates that user voicing activity is absent, wherein the at least two transfer functions comprise a first transfer function and a second transfer function; and

removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals.”

The Office Action states, at page 3, that none of the specification, any original claim, or the figures support the highlighted (underlined by the Examiner) limitations.

Applicant respectfully directs the Examiner to US Patent Application Publication number US 2004/0133421 A1, which corresponds to the present application. In particular, Applicant directs the Examiner to the material found in

paragraphs [0024]-[0057], along with Figures 2-5. These portions of the present application present a very detailed explanation directed specifically at the language rejected under 35 U.S.C. §112, first paragraph.

5 Given that such a large portion of the present application directly supports the language of claim 1, Applicant finds it hard to believe that the Examiner rejects this claim under 35 U.S.C. §112, first paragraph. Applicant is of the opinion that the Examiner either did not attempt to read any portion of the specification or, alternatively, that the Examiner does not understand the technology presented therein. Applicant suggests that in the future the Examiner at least read and understand the
10 specification prior to submitting such an apparently absurd rejection.

Claims 26 and 35 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The rejection of claim 26 is directed at the following portion of claim 26 (underlining provided in Office Action, at page 4):

15 “a processor coupled among the receiver and the at least one sensor that generates a plurality of transfer functions, wherein the plurality of transfer functions includes a first transfer function representative of a ratio of energy of acoustic signals received using at least two
20 different acoustic microphones of the at least two acoustic microphones, wherein the first transfer function is generated in response to a determination that voicing activity is absent from the acoustic signals for a period of time, wherein the plurality of transfer functions includes
25 a second transfer function representative of the acoustic signals, wherein the second transfer function is generated in response to a determination that voicing activity is present in the acoustic signals for the period of time, wherein acoustic noise is removed from the acoustic
30 signals using the first transfer function and at least one combination of the first transfer function and the second transfer function to produce the denoised acoustic data stream.”

35 The Office Action states, at page 4, that none of the specification, any original claim, or the figures support the highlighted (underlined by the Examiner) limitations. The

Office action further states, at page 4, that the language of claim 35 is “essentially similar” to that of claim 26 and is thus rejected for the same reasons as claim 26.

As stated above, Applicant respectfully directs the Examiner to US Patent Application Publication number US 2004/0133421 A1, and specifically the large
5 amount of material found in paragraphs [0024]-[0057], along with Figures 2-5. These portions of the present application present a very detailed explanation directed specifically at the language begin rejected under 35 U.S.C. §112, first paragraph. Again, Applicant suggests the Examiner perform at least some minimal review of the specification prior to submitting such an apparently baseless rejection.

10 In view of the detailed support found in the specification specifically directed at the language of claims 1, 26, and 35, Applicant submits that claims 1, 26, and 35 do comply with the written description requirement and, as such, submits that the rejections be withdrawn.

15 Rejections under 35 U.S.C. §103

Claims 1-3, 6, 8-11, 26, 28-30, 32, 35, 37, 38 and 41 are rejected under 35 U.S.C. §103(a) as being unpatentable over Silverberg et al, United States (US) Patent Number 5,406,622 (Silverberg), in view of Holzrichter, US Patent Number 5,729,694 (Holzrichter), and Hosoi, US Patent Number 5,754,665 (Hosoi). Applicant respectfully
20 traverses the rejection.

Applicant respectfully submits that Silverberg discloses an outbound noise cancellation circuit that consists of a transmit microphone and one or more noise-collecting reference microphones (column 2, lines 16-19). A first adaptive filter receives the output of a transmit microphone (column 2, lines 26-27). The output of
25 the first adaptive filter is subtractively combined with the output of a reference microphone to provide an enhanced reference signal having little or no speech signal content (column 2, lines 27-33).

A second adaptive filter receives the enhanced reference signal as an input (column 2, lines 34-35). The second adaptive filter produces an output which consists
30 substantially of noise energy only, and the output of the second adaptive filter is a

noise cancellation signal (column 2, lines 35-38). The noise cancellation signal is summed with the unprocessed output of the transmit microphone to provide an output signal in which the outbound noise has been removed (column 2, lines 21-25).

Each of the adaptive filters is active or not depending on the presence or
5 absence of speech energy (column 3, lines 10-12). If speech energy is present, the weights of the first adaptive filter are allowed to update, but if speech is absent, the weights of the first adaptive filter are frozen at their last setting (column 3, lines 12-16). Further, if speech energy is absent, the weights of the second adaptive filter are allowed to update, but if speech is present, the weights of the first adaptive filter are
10 frozen at their last setting (column 3, lines 16-20).

The Office Action states, at page 3, that Silverberg does not explicitly teach receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user. Applicant agrees that Silverberg does not teach receiving a voice activity signal that includes information on vibration of
15 human tissue associated with human voicing activity of a user.

The Office Action states, at page 3, that Silverberg does not explicitly teach at least two transfer functions that comprise a first transfer function and a second transfer function. Applicant agrees that Silverberg does not teach at least two transfer functions that comprise a first transfer function and a second transfer function.

20 The Office Action states, at page 3, that Silverberg does not explicitly teach removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. Applicant agrees that Silverberg does not teach removing acoustic noise from
25 at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals.

While Silverberg fails to teach at least two transfer functions that comprise a first transfer function and a second transfer function, Applicant also fails to find any
30 teaching in Holzrichter of at least two transfer functions that comprise a first transfer

function and a second transfer function. Furthermore, while Silverberg fails to teach application of a first transfer function and at least one combination of the first transfer function and the second transfer function, Applicant also fails to find any teaching in Holzrichter of removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. Instead of a transfer function, Holzrichter generates a Fourier Transform, which is a measure of the frequency content of a signal. In order to generate a transfer function, two signals (an input and output) are needed. Holzrichter teaches the use of a single signal and simply transforms the single signal into the frequency domain, which is completely different from, and exclusive of, taking two signals and generating a transfer function.

Therefore, Holzrichter, like Silverberg, does not disclose at least two transfer functions that comprise a first transfer function and a second transfer function and, as such, does not overcome the deficiencies of Silverberg in making claim 1 unpatentable. Consequently, the combination of Silverberg in view of Holzrichter fails to disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. For at least these reasons, Applicant respectfully submits that amended claim 1 is patentable over Silverberg in view of Holzrichter.

Considering that the combination of Silverberg and Holzrichter does not disclose at least two transfer functions that comprise a first transfer function and a second transfer function, and does not disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals, the Office Action asserts that Hosoi describes these elements missing from both Silverberg and Holzrichter. Specifically, the Office Action asserts, at page 6, that Hosoi teaches a first transfer function (Figure 3, element 11) and a second transfer function (Figure 3, element 12),

and removing acoustic noise from at least one of the acoustic signals by applying the first transfer function (element 11) and at least one combination (element 15) of the first transfer function (element 11) and the second transfer function (element 12) to the acoustic signals and generating denoised acoustic signals. Applicant submits Hosoi does not teach at least two transfer functions that comprise a first transfer function and a second transfer function. Furthermore, Applicant submits Hosoi does not describe removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. Applicant's reasoning follows.

Applicant submits Hosoi describes a noise canceller comprising analog-to-digital (A/D) converters 11, 12 which convert signals 101, 102 from microphones 2, 3 to digital signals (column 2, lines 53-55). Hosoi describes that the noise canceller includes adder 16 and Finite Impulse Response (FIR) adaptive filter 14 which operate as a noise canceller when microphone 2 is used for speech and microphone 3 is used for noise (column 2, lines 55-58). Hosoi describes that the noise canceller includes adder 15 and FIR adaptive filter 13 which operate as a noise canceller when microphone 2 is used for noise and microphone 3 is used for speech (column 2, lines 58-60).

Regarding the noise cancellation, Hosoi describes that FIR adaptive filter 13 generates an estimated noise signal which is the estimated noise component contained in voice signal of microphone 3 based on the noise signal from microphone 2 (column 3, lines 6-9). Adder 15 outputs voice signal 104 in which noise is reduced by subtracting this estimated noise signal from the voice signal from microphone 3 (column 3, lines 9-12).

Applicant submits, that in contrast to claim 1, Hosoi does not describe at least two transfer functions that comprise a first transfer function and a second transfer function. In fact, Hosoi does not describe any transfer function. The component of Hosoi that the Examiner points to as being a first transfer function (see Office Action, page 6, "a first transfer function (see fig. 3 (11)) is in fact an analog-to-digital

converter (Hosoi, column 2, line 54, “A/D converters 11, 12 which convert signals 101, 102 from microphones 2, 3 to digital signals”) (emphasis added). Likewise, the component of Hosoi that the Examiner points to as being a second transfer function (see Office Action, page 6, “a second transfer function (12)”) is in fact also an analog-to-digital converter (Hosoi, column 2, line 54, “A/D converters 11, 12 which convert signals 101, 102 from microphones 2, 3 to digital signals”) (emphasis added). Analog-to-digital converts are not transfer functions, and do not perform any function that is equivalent to a transfer function. Thus, Hosoi, like Silverberg and Holzrichter, does not describe at least two transfer functions that comprise a first transfer function and a second transfer function.

Applicant submits that, as Hosoi does not describe at least two transfer functions that comprise a first transfer function and a second transfer function, Hosoi does not describe removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. The component of Hosoi that the Examiner points to as describing this element of claim 1 is in fact an adder that, according to Hosoi, subtracts an estimated noise signal (output from the FIR adaptive filter 13) contained in the signal from microphone 2 from the voice signal of microphone 3. Therefore, as Hosoi describes an operation that adds two signals, where one signal is output from a FIR filter and the other signal is output from an analog-to-digital converter, Hosoi does not describe removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals (emphasis added).

For at least these reasons, Applicant respectfully submits that claim 1 is patentable over Silverberg in view of Holzrichter and Hosoi.

As claims 2, 3, 6, 8-11, 45, and 47 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is patentable over Silverberg in

view of Holzrichter and Hosoi, Applicant submits that claims 2, 3, 6, 8-11, 45, and 47 are patentable over Silverberg in view of Holzrichter and Hosoi.

Applicant submits that claim 26 is patentable over Silverberg in view of Holzrichter and Hosoi for the reasons stated above with reference to claim 1. As
5 claims 28-30, 32 and 49 depend from amended claim 26 and include further limitations thereon, and since amended claim 26 is patentable over Silverberg in view of Holzrichter and Hosoi, Applicant submits that claims 28-30, 32 and 49 are patentable over Silverberg in view of Holzrichter and Hosoi.

Applicant submits that claim 35 is patentable over Silverberg in view of
10 Holzrichter and Hosoi for the reasons stated above with reference to claim 1. As claims 37 and 38 depend from amended claim 35 and include further limitations thereon, and since amended claim 35 is patentable over Silverberg in view of Holzrichter and Hosoi, Applicant submits that claims 37 and 38 are patentable over Silverberg in view of Holzrichter and Hosoi.

15 Claims 31 and 45 are rejected under 35 U.S.C. §103(a) as being unpatentable over Silverberg as modified by Holzrichter and Hosoi, and further in view of Cezanne et al., US Patent Number 5,473,701 (Cezanne). As described in detail above, the combination of Holzrichter, Silverberg, and Hosoi does not disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and
20 at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. Applicant also fails to find any teaching in Cezanne of the application of a first transfer function and at least one combination of the first transfer function and the second transfer function. Consequently, the combination of Silverberg, Holzrichter, Hosoi, and Cezanne fails to
25 disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. For at least this reason, Applicant respectfully submits that claims 31 and 45 are patentable over Silverberg in view of Holzrichter, Hosoi, and Cezanne.

- Claims 47 and 49 are rejected under 35 U.S.C. §103(a) as being unpatentable over Silverberg as modified by Holzrichter and Hosoi, and further in view of Bradley et al., US Patent Number 5,463,694 (Bradley). As described in detail above, the combination of Holzrichter, Silverberg, and Hosoi does not disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. Applicant also fails to find any teaching in Bradley of the application of a first transfer function and at least one combination of the first transfer function and the second transfer function.
- Consequently, the combination of Silverberg, Holzrichter, Hosoi, and Bradley fails to disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. For at least this reason, Applicant respectfully submits that claims 47 and 49 are patentable over Silverberg in view of Holzrichter, Hosoi, and Bradley.

Conclusion

- In view of the foregoing amendments and Remarks, Applicant respectfully submits that all rejections have been overcome, and the claims are now allowable.
- Prompt allowance of the application is earnestly solicited. Examiner LAO is respectfully requested to telephone the undersigned to facilitate resolution of any issues prior to allowance of the application.

Authorization to Charge Deposit Account

If there are any fees due and unpaid in this application, please charge Deposit Account No. 503616 for these fees (Attorney Docket No. ALPH.P010X).

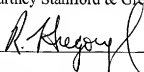
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Respectfully submitted,
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A handwritten signature in black ink, appearing to read "R. Gregory", is written over a horizontal line.

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